

**DRAFT LIMITED INVESTIGATION WORK PLAN  
COUNTY BRIDGE OVER SAND CREEK  
E/W 815 EAST OF BRISTOW  
CREEK COUNTY, OKLAHOMA**

*Prepared For:*

***Oklahoma Department of Transportation  
Environmental Programs***

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### **ACRONYMS AND ABBREVIATIONS**

CIRB	County Improvements for Roads and Bridges Program
COC	Constituents of Concern
DEQ	Oklahoma Department of Environmental Quality
ECC	Enviro Clean Cardinal, LLC
EPA	United States Environmental Protection Agency
ODOT	Oklahoma Department of Transportation – Environmental Programs
PAH	Polycyclic Aromatic Hydrocarbons
QA/QC	Quality Assurance/Quality Control
SVOC	Semi Volatile Organic Compound
VOC	Volatile Organic Compound

**LIMITED INVESTIGATION WORK PLAN  
COUNTY BRIDGE OVER SAND CREEK  
COUNTY ROAD E/W 815, EAST OF BRISTOW  
CREEK COUNTY, OKLAHOMA  
JANUARY 15, 2016**

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**1.0 INTRODUCTION**

Enviro Clean Cardinal LLC, (ECC) under Engineering Contract EC-1548D with Oklahoma Department of Transportation – Environmental Programs (ODOT) has prepared this Work Plan for a limited investigation of certain borrow soils used in the modification of a County Bridge over Sand Creek, located on E/W 815, approximately one half mile east of the City of Bristow, Oklahoma (Site). Pursuant to state statute, ODOT is charged with the administration of the County Improvements for Roads and Bridges (CIRB) Program. The modifications to Creek County's County Bridge of Sand Creek on E/W 815 is part of the CIRB Program. This Work Plan is for a limited environmental investigation of borrow soils received from a local source recently identified to be within the boundaries of a United States Environmental Protection Agency (EPA) Superfund Site referred to as the Wilcox Refinery Superfund Site. The project Site location and topographic features are shown on **Figure 1**.

**1.1 BACKGROUND**

The following information was obtained through a Site visit and an informal interview with a representative of the construction contractor and two representatives of the firm contracted to perform construction inspections.

The subject borrow soils of this limited investigation were utilized in earthwork construction associated with the bridge. The soils originated from a borrow source area located approximately 0.3 miles to the north of the Site. On or about October 5, 2015, the bridge contractor started importing soils from the borrow source area. Records maintained by the construction inspector purportedly indicate that 32 loads of such borrow soils were delivered to the Site. Each load was estimated to be 18 cubic yards in volume, for a total estimated volume of 576 cubic yards.

In the latter part of October 2015, the EPA and the Oklahoma Department of Environmental Quality (DEQ) informed ODOT's Environmental Programs Division that borrow soils used at the Site were being obtained by the bridge contractor from the Wilcox Refinery Superfund Site, and that testing may be needed to determine if such borrow soils contained chemicals of concern (COC) associated with the Wilcox Refinery Superfund Site (ODOT, 2015).

Based upon the investigation to date, the estimated 576 cubic yards of borrow soils were placed in the following locations on the Site:

1. in and around the bridge approaches,
2. adjacent to the abutment on the west side of Sand Creek along the southern edge of the road, and
3. in two residential driveway tie-ins on the eastern side of the bridge.

The borrow soils placed adjacent to the west bridge abutment are reported to range in thickness from approximately zero at the base of the slope to approximately eight feet at the top of the slope. The thickness of the borrow soils elsewhere purportedly ranges from near zero to approximately two feet.

The lateral extent of the borrow soils is generally indicated by differences in coloration between the borrow soils and those soils that were native to the immediate vicinity of the bridge and by the limits of construction. The borrow soils placed around the abutment have been covered with large (approximately 24 inch) riprap and the underlying filter blanket.

## 2.0 TASK NARRATIVE

This section of the Work Plan includes a summary of the methodology for collecting and analyzing soil samples. The samples will be used to determine if soils from the borrow source area on the Wilcox Refinery Superfund Site, used during the construction of the bridge, contain COCs potentially associated with the Wilcox Refinery Superfund Site (Weston, 1997) and if so, to determine the concentrations of those COCs within the soil samples.

The potential presence of refinery related COCs in the borrow soil, at issue, placed at the Site will be evaluated. Representative samples will be collected from a limited number of locations and submitted to TestAmerica Laboratories, Inc. Nashville, Tennessee (TestAmerica).

### 2.1 SOILS

To determine the potential presence of COCs within the soils placed around the constructed bridge and roadway approaches, five samples will be collected across the Site. Using a 50 foot by 50 foot grid pattern, "sample cells" will be established along each side of the centerline of the newly constructed portions of county road E/W 815.

West of the bridge, sample cells will be established beginning near station 10+40, as shown on the construction drawings (ODOT, 2014), and will include the driveway apron in the southwest portion of the Site. The sample cell grid will continue on both sides of the centerline of the road eastward to a point at or east of the bridge abutment at station 13+70. It is estimated there will be 14 sample cells on the west side of Sand Creek.

The sample cell grid will be established on the east side of Sand Creek starting east of the bridge abutment near station 15+07 and continue on both sides of the centerline of the road to a point 150 ft east and will include the driveway tie ins near station 16+37. It is estimated there will be six sample cells on the east side of Sand Creek.

The east and west grids will contain a combined total of 20 sample cells, each having an approximate area of 2,500 ft<sup>2</sup>. As discussed with EPA and DEQ, a subset of the 20 cells has been selected for sampling. Samples will be collected from five of the 20 sample cells as shown on **Figure 2**. These cells were selected to be representative of the bridge approaches and the nearby residential driveways. Each of the sample locations will be located in the field using a hand held GPS unit loaded with the **Figure 2** aerial photograph depicting the 50 ft x 50 ft grid.

Each of the five sample cells selected will be divided into four quadrants approximately equal in area producing northwest, northeast, southwest and southeast quadrants. A grab sample will be collected using a decontaminated hand-auger from each cell quadrant (four samples). The soils from each quadrant will be placed into a stainless steel bowl and blended thoroughly to form a composite sample representative of a specific depth interval for the sample cell. The boring in each quadrant will be advanced to the apparent soil interface between the imported borrow soils and the native in place soils. Samples will be collected from the following depth intervals containing the imported borrow soils; 0–6 inch, 6–12 inch, 1–3 ft, and 2 ft increments thereafter. Only those quadrants observed to contain borrow soil material at each respective depth intervals will be sampled.

Samples will be submitted for laboratory analysis for the “Skinner List” parameters listed on **Table 1**. For semi-volatile organic compounds (SVOC), polycyclic aromatic hydrocarbons (PAH), and metals, an aliquot of the composite soil sample will be collected from the mixing bowl and placed directly into the laboratory-prepared sample containers. For volatile organic compounds (VOC) analysis, a fifth soil sample will be collected from the approximate center of the sample cell. This portion of the sample will be a non-composite, discrete grab sample collected using field preservation Method 5035 and submitted for VOC analysis according to EPA method 8260C.

The laboratory provided sample containers will be sealed, labeled as to source and content, packed on ice for preservation, and placed under chain-of-custody control for transport to the analytical laboratory.

## **2.2 QUALITY ASSURANCE/QUALITY CONTROL SAMPLES**

Quality Assurance/Quality Control (QA/QC) samples including equipment rinsate, field duplicates and matrix spike/matrix spike duplicate (MS/MSD) samples will be collected. Equipment rinsate samples will be collected daily during the use of sampling equipment which contacts sample material. Duplicate samples will be collected at a frequency of 10% and MS/MSD samples will be collected at a frequency of 5%, or one MS/MSD sample for every 20 samples collected. At a minimum one duplicate and one MS/MSD sample will be collected during this sampling event.

## **2.3 DATA REVIEW**

Data will be presented to EPA and DEQ for review and discussion.

### **3.0 REFERENCES**

- ODOT, 2015. E-mail October 27, 2015 from DEQ to ODOT, Regarding Bridge Project in Creek County.
- Weston, 1997. Expanded Site Inspection Report, Wilcox Oil Company, Bristow, Creek County, OK, Weston, March 1997.
- ODOT, 2014. State of Oklahoma, Department of Transportation, Plan of Proposed County Bridge, Creek County, State Job No. 29217(04).



## TABLES

**Table 1 : Skinner List Analytical Parameters**  
**County Bridge Over Sand Creek, Limited Investigation**  
**Oklahoma Department of Transportation**

Chemicals of Concern	Method	RL (mg/kg)	MDL (mg/kg)
<b><i>Inorganics</i></b>			
Antimony	6010C	10.0	1.00
Arsenic	6020	0.50	0.20
Barium	6010C	2.00	1.00
Beryllium	6010C	1.00	0.200
Cadmium	6010C	1.00	0.100
Chromium	6010C	1.00	0.900
Cobalt	6010C	2.00	1.00
Cyanide	9012B	2.00	1.00
Lead	6010C	1.00	0.500
Mercury	7471B	0.100	0.0300
Nickel	6010C	2.00	0.600
Selenium	6010C	2.00	1.10
Silver	6010C	1.00	0.400
Vanadium	6010C	10.0	2.00
Zinc	6010C	10.0	5.00
<b><i>Volatile Organic Compounds (VOCs)</i></b>			
Benzene	8260B	0.00200	0.000670
Carbon disulfide	8260B	0.00500	0.00360
Chlorobenzene	8260B	0.00200	0.000670
Chloroform	8260B	0.00200	0.000670
1,2-Dichloroethane	8260B	0.00200	0.000670
1,1-Dichloroethane	8260B	0.00200	0.000670
1,4-Dioxane	8260B	0.200	0.0760
Ethylbenzene	8260B	0.00200	0.000670
Ethylene dibromide (EDB or 1,2-dibromoethane)	8260B	0.00200	0.00100
Methyl ethyl ketone (MEK)	8260B	0.0500	0.00510
Methyl tertiary-butyl ether (MTBE)	8260B	0.00200	0.000960
Styrene	8260B	0.00200	0.00110
Toluene	8260B	0.00200	0.000740
1,1,1-Trichloroethane	8260B	0.00200	0.000920
Trichloroethene	8260B	0.00200	0.000960
Tetrachloroethylene	8260B	0.00200	0.000730
Xylenes (total)	8260B	0.00600	0.00123

**Table 1 : Skinner List Analytical Parameters**  
**County Bridge Over Sand Creek, Limited Investigation**  
**Oklahoma Department of Transportation**

Chemicals of Concern	Method	RL (mg/kg)	MDL (mg/kg)
<b><i>Semivolatile Organic Compounds (SVOCs)</i></b>			
Acenaphthene	8270D	0.0670	0.0100
Anthracene	8270D	0.0670	0.00900
Benzo(a)anthracene	8270D SIM	0.00333	0.00120
Benzo(b)fluoranthene	8270D SIM	0.00333	0.00150
Benzo(k)fluoranthene	8270D SIM	0.00333	0.00100
Benzo(a)pyrene	8270D SIM	0.00333	0.00180
Bis(2-ethylhexyl) phthalate	8270D	0.333	0.0130
Chrysene	8270D SIM	0.00333	0.00180
o-Cresol	8270D	0.333	0.0930
m & p-Cresol	8270D	0.333	0.0200
Dibenz(a,h)anthracene	8270D SIM	0.00333	0.00190
Di-n-butyl phthalate	8270D	0.333	0.0130
1,2-Dichlorobenzene*	8270D	0.333	0.0100
1,3-Dichlorobenzene*	8270D	0.333	0.0140
1,4-Dichlorobenzene*	8270D	0.333	0.00700
Diethyl phthalate	8270D	0.333	0.0140
2,4-Dimethylphenol	8270D	0.333	0.192
Dimethyl phthalate	8270D	0.333	0.00800
2,4-Dinitrophenol	8270D	0.333	0.110
Fluoranthene	8270D	0.0670	0.00900
Fluorene	8270D	0.0670	0.0120
Indeno(1,2,3-cd)pyrene	8270D SIM	0.00333	0.00180
Naphthalene	8270D	0.0670	0.00900
4-Nitrophenol	8270D	0.333	0.0150
Phenanthrene	8270D	0.0670	0.00900
Phenol	8270D	0.333	0.0140
Pyrene	8270D	0.0670	0.0120
Pyridine	8270D	0.667	0.0140
Quinoline	8270D	0.333	0.0190

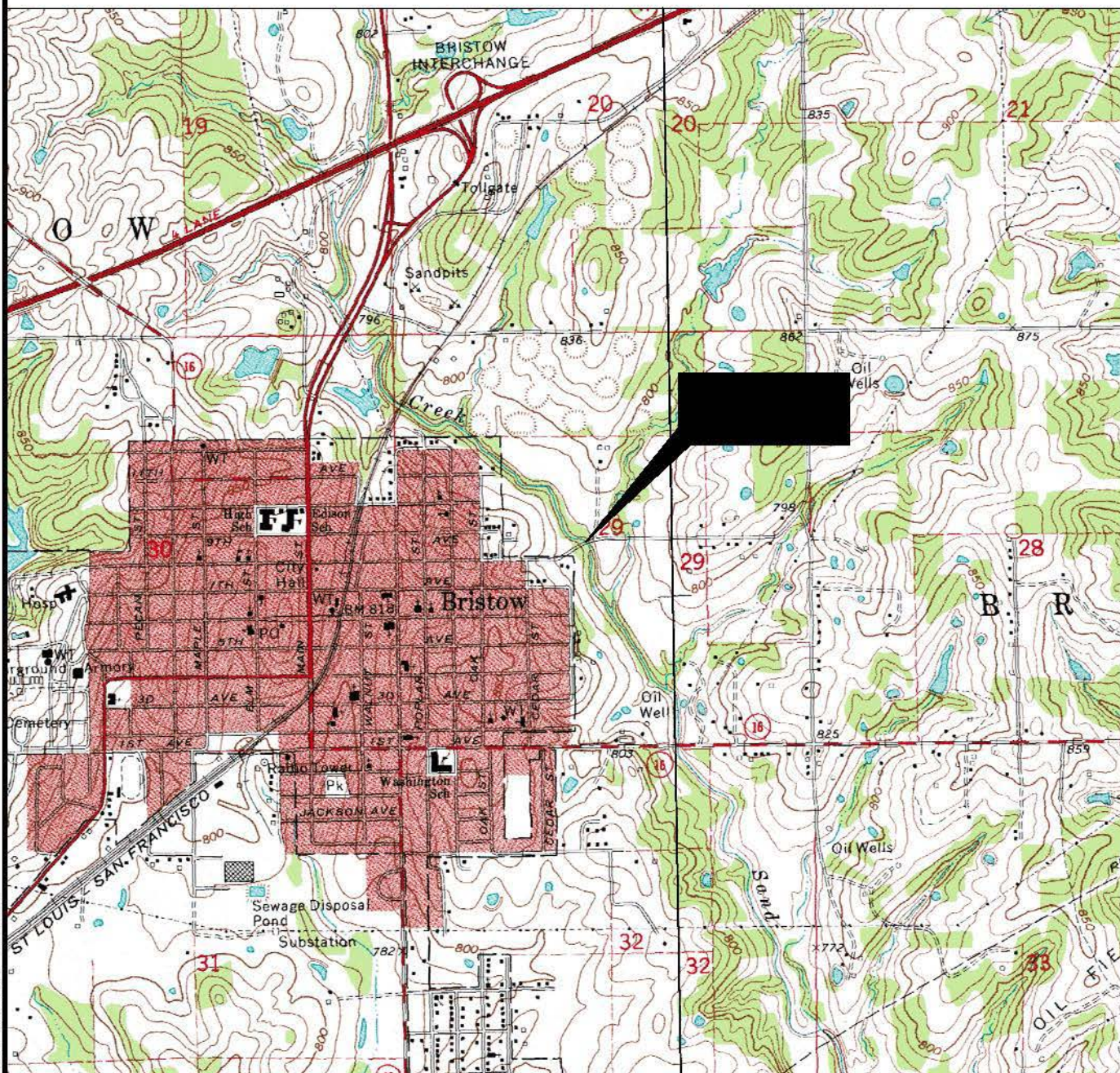
Notes:

\* These compounds are listed with SVOCs on the Skinner list. However, they are also reported with the VOCs method (SW-846 8260C).

## FIGURES



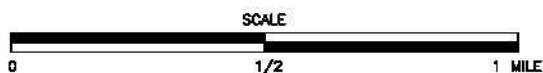
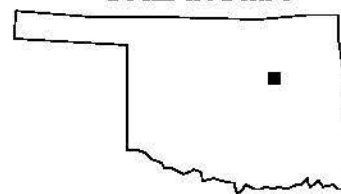
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**SOURCE:** U.S.G.S. 7.5 MINUTE TOPOGRAPHIC QUADRANGLES  
BRISTOW, OKLAHOMA 1973 AND  
SLICK, OKLAHOMA 1973

OKLAHOMA



**CLIENT**  
OKLAHOMA DEPARTMENT OF TRANSPORTATION

**LOCATION**  
COUNTY BRIDGE OVER SAND CREEK  
E/W 815 EAST OF BRISTOW, CREEK CO., OKLAHOMA

**FIGURE TITLE**  
***SITE LOCATION AND  
TOPOGRAPHIC FEATURES***

**DOCUMENT TITLE**  
LIMITED INVESTIGATION WORK PLAN



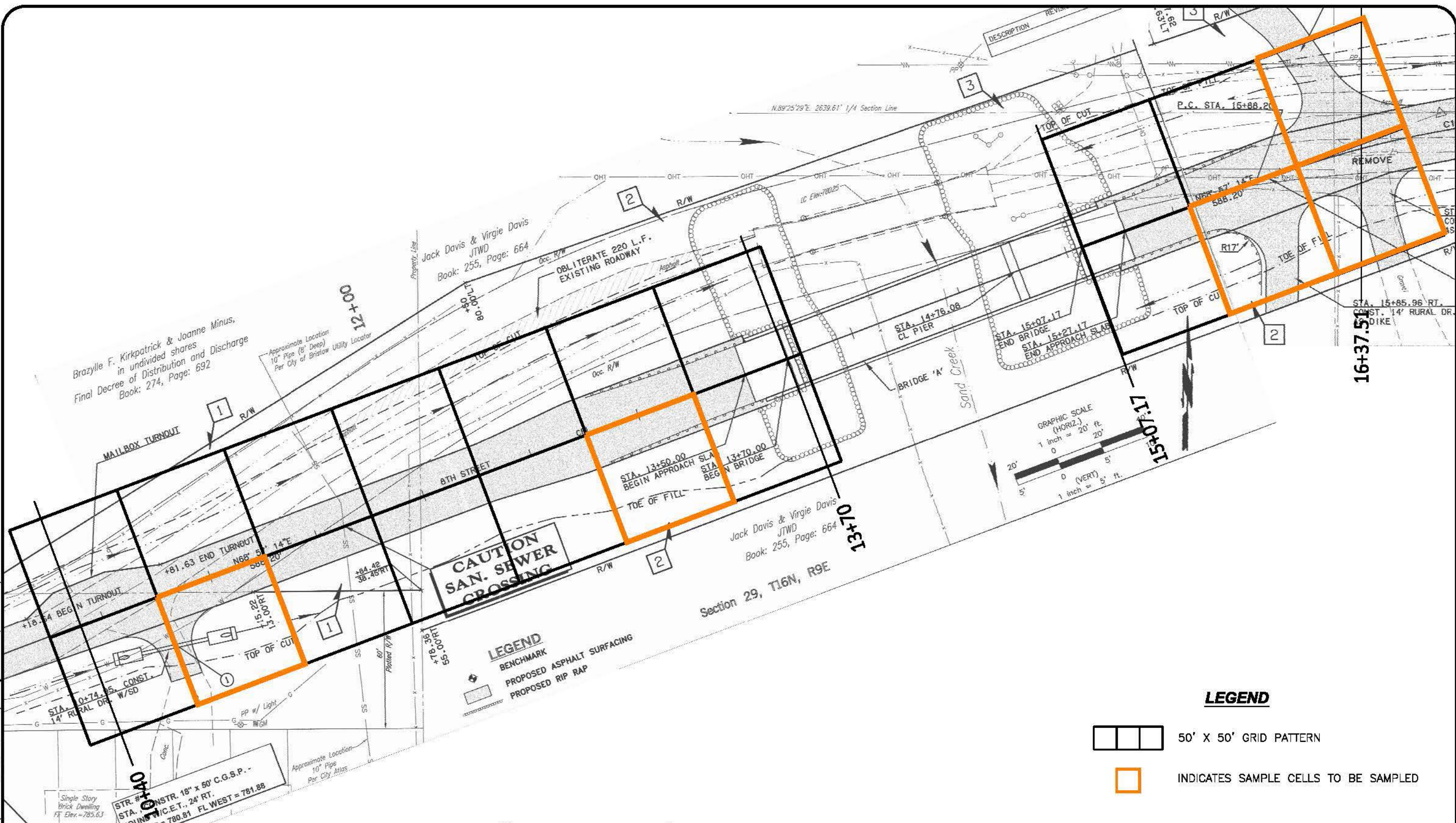
**Enviro Clean Cardinal, LLC**  
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DATE	1/15/2016	DESIGNED BY	DB
SCALE	AS SHOWN	APPROVED BY	DB
PROJECT NUMBER		DRAWN BY	SKG
ODTEOK1526		FIGURE NUMBER	1

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D:\Projects\0001\04\_CAD\20160115\_WP\_F02\_SiteSamples.dwg on Jan 15, 2016 - 1:56pm



SOURCE: REFERENCED BACKGROUND DRAWING FROM THE STATE OF OKLAHOMA, DEPARTMENT OF TRANSPORTATION, CREEK COUNTY, STATE JOB NO. 28217(04), APPROVED JUNE 30, 2014

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DOCUMENT TITLE  
LIMITED INVESTIGATION WORK PLAN

FIGURE TITLE  
PROPOSED SAMPLE GRID LAYOUT

CLIENT  
OKLAHOMA DEPARTMENT OF TRANSPORTATION

LOCATION  
COUNTY BRIDGE OVER SAND CREEK  
E/W 815 EAST OF BRISTOW, CREEK CO., OKLAHOMA

DESIGNED BY	DB	SCALE	1" = 40'
APPROVED BY	DB	DATE	1/15/2016
DRAWN BY	SKG		

PROJECT NUMBER

ODTEOK1526

FIGURE NUMBER

2